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ABSTRACT

Research on teacher effectiveness addresses questions about how teachers bring about desirable student outcomes. Until recently, most research has focused on long-term outcomes, such as achievement gains over one year. Short-term outcomes--students' immediate responses to instruction--are also important. Four categories of short-term student outcomes that may be observed by teachers are attention, initiative, success, and understanding of how and why to do classroom work. For each category, research has suggested ways to encourage and sustain immediate student responses that support learning. Two principles underlie the suggestions. First, teachers must remain aware of student responses by creating work contacts with all the students frequently and on a regular basis. The second principle reflected in many of the suggestions is that teachers can help students learn how to respond to instruction by arranging the classroom environment to make attention and initiative more likely and by teaching students how and when to attend, seek help, and apply certain strategies for understanding instruction and performing work. A list of references is appended. (Author/JD)

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STUDENT RESPONSES TO CLASSROOM INSTRUCTION

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Abstract

Research on teacher effectiveness addresses questions about how teachers bring about desirable student outcomes. Until recently, most research has focused on long-term outcomes, such as achievement gains over a year's time. This article suggests that short-term outcomes--students' immediate responses to instruction--are also important. Four categories of short-term student outcomes are described that may be observed by teachers while instruction proceeds: attention, initiative, success, and understanding of how and why to do classroom work. For each category, research is reviewed and suggestions are made for teachers. Two principles underlie the suggestions: (1) teachers must remain aware of student responses to instruction by creating frequent work contacts with all students, and (2) teachers can help students learn how to respond to instruction by the ways that they arrange the classroom environment and by teaching specific work skills.

STUDENT RESPONSES TO CLASSROOM INSTRUCTION

Linda M. Anderson[1,2]

Educators have long been interested in the teacher-effectiveness question: How do teachers bring about desirable student outcomes? In the last decade, research on teaching has addressed this question through naturalistic studies of classrooms, in which teacher behaviors were related to students' achievement test scores, especially for the areas of reading and math in the elementary grades. (For reviews of this research, see Brophy, 1979 and Good, 1979).

Such research has identified patterns of teaching associated with long-range goals like achievement test gains, but it provided little information to aid teachers as they make the many day-to-day, minute-to-minute decisions that are necessary to keep a classroom running. For example, one of the most widely replicated findings of the last decade of research on teaching effectiveness has been that "time on task" is associated with achievement gains. That is, the more time a student spends actively engaged in tasks related to certain content (and geared to an appropriate level of difficulty), the more (s)he achieves on a test of that content (Denham & Lieberman 1980). This finding makes sense, as far as it goes. However, it does not help a teacher decide *how* to increase time on task; it only emphasizes that this is a valuable goal for a

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teacher who wishes to increase students' achievement on tests of basic skills.

Researchers of teaching are aware of this shortcoming of much of the early research, and recently have developed new ways to study teaching effects that more clearly reflect the complexities of daily classroom life. One new approach has focused on how teachers' effects are *mediated* by students. To say that students are mediators of teaching effects means that the responses and understanding of particular students will influence the way that each one learns as a result of instruction. For example, several students may watch a demonstration together, read the same passage, or answer the same question. For each student, new learning as a result of those experiences will occur in a unique way, depending on the student's background knowledge and aptitude, effort at attending to and retaining the information, and understanding of objectives of the instruction. In recognition of this, several researchers have argued for the need to study student variables, especially student mediating processes, in order to understand more about how teaching effects occur (Doyle, 1979a; Rosenshine, 1979; Winne & Marx, 1977). This article examines one approach to the study of student mediation of instructional effects: a focus on students' immediate responses to instruction.

This focus recognizes that teachers attend to both long-term and short-term outcomes of instruction. Long-term outcomes are reflected in accumulated knowledge and skills acquired over time (e.g., at the end of the second grade the child has learned to read). Short-term outcomes, in contrast, may be assessed as instruction proceeds. These are the students' immediate responses that indicate whether or not they are likely

to benefit from the instruction--are they attending to and understanding what they see and hear? Teachers do attend to cues of apparent attention and involvement, as demonstrated by research on teachers' thinking and decision making during instruction (Clark & Yinger 1979; Doyle 1979b). However, until recently, most research on teaching effectiveness did not focus on these short-term responses to instruction, but only on longer-term achievement. Thus, the research reported here reflects a current movement toward the study of classroom phenomena that are meaningful to teachers as they conduct the daily tasks of teaching.

In this article, four categories of immediate student responses are described that may indicate to teachers whether and how students are likely to learn from instruction. The four kinds of responses are attention, initiative, success, and understanding of how and why to do classroom work.

Some research has suggested ways that teachers can organize and present instruction that facilitate these student responses; this research is reviewed below and suggestions for teachers are based on the research. In cases where a kind of student response has not been studied extensively, suggestions for teachers are also made, but based on other classroom research that seems pertinent.

The research described in this article has two implications for teachers. First, it suggests some important student responses to which teachers should be sensitive as they teach. Thus, it suggests what teachers should learn to "see" as they observe and interact with students. Secondly, this research suggests some ways that teachers may plan and conduct daily instruction that encourage and sustain the immediate student responses that support learning.

Different Students, Different Responses

As examples of the ways that immediate student responses determine how much students learn from instruction, consider these two vignettes of classroom life.

It is an early spring day in Ms. Johnston's first-grade class. She is teaching the Cookie Monster's Reading Group, which includes Kevin, who is considered a low achiever *in most academic areas. However, upon observing his reading group, a person would not conclude that he was having any difficulties in school. He pays eager attention to the teacher, who is conducting a fairly rapid-paced lesson in which the students sound out new words. Kevin is successful whenever his turn comes, and he appears to be pleased with himself when he figures out a brand new word. After the group lesson ends, he returns to his seat where he is to complete a variety of seatwork assignments that were explained earlier in the morning. The teacher immediately begins another reading group.*

Once he is back at his seat, Kevin does not appear to be the attentive, successful student he was a few moments before. He begins to daydream after writing a few words on his paper, and he accomplishes very little else during the morning. Instead of resuming work, Kevin cleans out his desk and begins to play with his erasers as if they were spaceships. After several minutes, he leans over to a friend and begins to talk about the most recent episode of The Incredible Hulk. *When the teacher calls his name, he straightens up, writes one more word on his paper, and then resumes the eraser play.*

Across the hall, another first-grade teacher, Ms. Simpson, leads a

whole-class discussion as the students compose their daily "newspaper." As Ms. Simpson calls for contributions, Melanie waves her hand, excitedly describes an occurrence at her home, and then listens attentively as the next student speaks. When the teacher finishes writing the newspaper, she has the class read it in unison, and then calls for individual volunteers to read it. Melanie participates in the choral reading and volunteers to read it by herself. She reads smoothly and correctly. Two words in the story were new, but she calls them correctly after hearing them introduced a few minutes before. The teacher asks the class if they can identify the compound word, and Melanie eagerly waves her hand, is called on, and answers correctly.

Meanwhile, Stacy, another student in the room, has paid little attention to the composition of the newspaper. While other students were talking and the teacher was writing their suggestions, Stacy was trying to tie her shoe or was licking her finger to clean marks off the top of her desk. She seldom looked at the board. When the teacher called for the choral reading, Stacy said some of the words, especially for the first two lines that followed a standard format each day. However, she stopped participating when the less familiar words were reached. She did not volunteer to read the newspaper herself, and when other students read it, she turned to look at them rather than at the board. As the teacher asked about the compound word, Stacy quietly called out an answer that was not correct, but the teacher did not hear this and thus did not comment. As Melanie was supplying the correct answer, Stacy did not appear to listen as she opened her drawer and began to pull out items in search of her pencil.

Both vignettes of classroom life are based on actual observations that were designed to highlight individual student's responses to instruction.[3] In the first vignette, Kevin demonstrated very different responses to instruction depending on the setting--whether he was in the reading group or at his seat. Thus, the same student looked very different when settings and tasks differed.

In the second vignette, two students revealed very different responses in the same setting. One student demonstrated interest and involvement in the discussion; the other did not.

The differences in student responses described here are familiar to teachers. Some students will exhibit more attention, involvement, and initiative, and in some situations will be more successful than other students. This concerns teachers, who know that learning occurs only when a student has produced some kind of active response to the instruction, such as paying attention, practicing a skill, or using new information to solve a problem. Teachers know that learning is not a passive enterprise; learning outcomes are dependent in part on what learners put into a potentially instructive situation--whether or not they respond in ways that facilitate learning.

Consider Kevin's morning. He probably learned much more during the reading group, where he was attentive, involved, and successful in practicing new skills, than he learned from the written assignments, for which he put forth little effort. Similarly, Melanie probably gained more from the group discussion than did Stacy, largely due to their differing actions during the discussion.

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[3]Instruction, as used here, refers to both the presentation of new information and the provision of opportunities to practice using information or skills.

Both of the teachers in these vignettes readily acknowledged that students differed in their responses, and recognized that the students' responses were related to whatever benefits were obtained from the instruction. In the case of Kevin's seatwork performance and Stacy's lack of involvement, they also readily agreed that the student responses were not desirable.

When asked how they explained the differences in the students' responses, the two teachers answered in terms of motivation or work habits:

> Kevin only works when the teacher is right there. He just doesn't have any independent work habits. You have to stay right on top of him and I can't do that and teach reading at the same time.

> Stacy lacks listening skills and has no interest in participating, so she doesn't. Melanie, on the other hand, seems to have a real love of learning and desire to have her say and hear what others say.

The point of view adopted in this article is that such explanations may be intuitively sensible as summaries of past performance, but they are not very helpful as teachers try to improve a student's responses to instruction. These kinds of explanations allude to supposedly stable patterns of motivation and work skills that are intrinsic to the child and therefore can be changed only by the child.

The research reviewed below suggests that an alternative view of student responses to instruction is feasible, one that suggests some ways to analyze instruction and its immediate effects on students' responses. This perspective recognizes that there are some individual student differences that the teacher cannot change, but it emphasizes that *the teacher can influence immediate student responses a great deal and should consider these as important, short-term indications of instructional effectiveness.*

As such, student responses are signals for the teacher that inform decisions to continue or to modify ongoing instruction.

Student Responses: Research and Suggestions for Teachers

Attention to Tasks

The short-term student response that has been studied the most is attention to task (also termed engagement and on-task behavior). Several studies have related student attention or time-on-task to achievement gains (e.g., see Cobb, 1972; Denham & Lieberman, 1980; Hoge & Luce, 1979; Hops & Cobb, 1974; Rosenshine & Berliner, 1978; Samuels & Turnure, 1974). But what determines why and when a student will pay attention to a learning activity? Student characteristics certainly play a role; higher-achieving students stay on-task more often than lower-achieving students (Good & Beckerman, 1978). Higher-achieving students more often finish their work independently, and may be off-task after that, while lower-achieving students more often delay completion of their work, rather than persisting (Rusnock & Brandler, Note 1; Smyth, Note 2).

However, it would be a mistake to assume that student attention and on-task behavior are primarily due to individual differences in students; certain instructional characteristics have also been linked to student involvement and attention. This research suggests to teachers some ways that they may analyze their instruction and modify it to create settings and tasks in which student attention is more likely to be maintained.

Then the instructor elicits active participation in the learning activity, attention is usually higher. For example, McKenzie and Henry, (1979) found higher rates of on-task behavior during a group lesson when

all students gave an overt, nonverbal response to each question (pointing to individual desk maps), compared to rates in a class in which an individual student answered a question publicly at a large map. Although the lesson was directed to a large group, provision was made for all students to respond frequently and to compare their individual answers to the one given publicly. One explanation for these results is that children, especially younger children in primary grades, can sustain involvement more easily when they are required to give active, individual responses than when the teacher expects only "mental monitoring."

A strategy similar to Mackenzie and Henry's might be used in group lessons by using individual chalkboards or slates while one student writes spelling words at the board, and by individuals working an arithmetic problem at their seats while other students work at the board. Through such methods, each student's attention is focused on the task at hand and the teacher can see who is understanding the lesson as it proceeds.

Teachers' strategies for selecting students during discussions will also influence attentiveness and active participation in the lesson. When only volunteers are called upon, other students may tune out, as Stacy did in the second vignette given above. However, if all students' contributions are regularly solicited and required, attentiveness may be greater.

Other characteristics of lessons that influence student attention are the "signal systems" inherent in instructional activities (Kounin & Doyle, 1975; Kounin & Gump, 1974; Kounin & Sherman, 1979). Signal systems are the arragnements of settings or the procedures within tasks that have the capacity to elicit and sustain participation. Kounin and his colleagues have identified three dimensions of signal systems that are associated

the arrangements of settings or the procedures within tasks that have the capacity to elicit and sustain participation. Kounin and his colleagues have identified three dimensions of signal systems that are associated with student involvement: *continuity* of signal emission (e.g., a film is continuous, but a child's show-and-tell story may lose momentum and be discontinuous); *insulation* (e.g., protection from distraction is afforded by the self-perpetuating nature of an activity, such as absorption in an engrossing book); and *intrusiveness* (e.g., the potential for materials to stimulate inappropriate behaviors; instruments and movement games may "overstimulate" children so that the original purpose of the lesson is lost).

Kounin and his associates found that students exhibited higher levels of attentiveness in lessons characterized by a higher degree of continuity, greater insulation, and/or less intrusiveness. Consider how Kevin attended to the activities in the reading group compared to his seatwork. The teacher quickly paced the reading group and presented questions at a level that Kevin could answer. These two factors probably contributed to *signal continuity*, leaving few gaps in the lesson for Kevin. (Gaps could arise from long delays between questions, or from questions at so difficult a level that Kevin could not think them through.) The teacher's control of the lesson (through pacing and selection of respondents) and successful management of the rest of the class created an insulated lesson, and activities were chosen that did not get out of hand, insuring low intrusiveness. By contrast, in the seatwork setting, signal continuity was much lower. Kevin had to assume more control of his own attentiveness in order to complete the task, but did not do so successfully. This can be related

to the lack of insulation built into the assignment (i.e., nothing about the assignment shielded Kevin from possible distraction).

There appear to be individual differences among students in the degree to which they can cope with discontinuity and close the gaps between signals, in order to persist in an activity or fit together seemingly disparate pieces of information. Similarly, there are differences in students' ability to create mental insulation for themselves and to ignore intrusive aspects of tasks. For some students, continuity, insulation, and protection from intrusiveness will need to be supplied to some degree, either through the task itself or through frequent teacher monitoring and/or control of lesson pace.

For example, instead of having distractible students perform written work at their seats for long periods of time (where they are surrounded by their peers and other stimuli), a teacher may alternate written assignments with activities of greater signal continuity (e.g., listening center exercises, flashcard drills with another student who will maintain a task-oriented attitude). The teacher may provide a more insulated work environment for inattentive students by repositioning them, although this can backfire in some unfortunate ways, especially if it means the student is out of the mainstream of some classroom activities. The intrusiveness of activities may be controlled by limiting the physical objects available to children. (This is exactly what many teachers do when they require students to clear their desks before important instructions are given.)

Thus, for children like Kevin, who only demonstrated good work habits under conditions of high continuity and insulation and low intrusiveness, the solution is not to hope that Kevin matures or gets serious about working. Instead, the research on signal systems

suggests that his teachers need to structure the tasks given him so that he is better able to pay attention and gain the concepts and skills necessary for academic progress.

Although research has demonstrated that these characteristics of lessons are associated with attention, little systematic research has been done to specify how lessons may be made more or less continuous, insulated, and intrusive. In particular, little work has been done on the analysis of independent seatwork, even though elementary students spend a large portion of their school day performing such work, and attention levels tend to be lower in seatwork than in teacher-led lessons (Rosenshine, 1979). One might hypothesize that some kinds of written tasks, such as handwriting practice copied from the board, phonics worksheets, or arithmetic problems, where each item on a page is performed independently of the others, provide less signal continuity than assignments like dot-to-dot puzzles or other game-like activities, where each step in a sequence triggers the next. Research is needed to test such hypotheses and determine ways that written assignments can be analyzed for their attention-directing properties.

Research done on classroom management also suggests ways that teachers' behaviors can influence student attention. Kounin (1970) identified several important ways that teachers create and maintain an atmosphere in which students are likely to attend. Similarly, work by Anderson, Evertson, and Emmer (1980) and Emmer, Evertson, and Anderson (1980) suggests ways that teachers instruct students in important going-to-school behaviors, including when and how to attend to the teacher. Good and Brophy (1978) also summarize principles of management that help teachers establish and maintain orderly classrooms.

All of the research reviewed above suggests ways that teachers may organize their rooms and their lessons to elicit greater attention from students. However, it must be kept in mind that the appearance of attention does not necessarily indicate that active learning is taking place, although attention is a precurser for learning from instruction, and therefore an important signal for teachers. The next three categories of student responses may suggest when students have gone beyond the appearance of attention to engage in learning activities in meaningful ways.

Student Initiative in Seeking Help

There have been several studies in which student initiation of work contacts with teachers was related to achievement in basic skills (see a review in Hoge & Luce 1979). Clearly, learning is most efficient when a learner can identify points at which assistance or feedback is needed and then seek them. The willingness to initiate contact and the skill to do so appropriately are important student responses that make learning more likely.

However, some students lack either the desire or the skills to identify gaps in their understanding and/or to seek the teacher's assistance. These students' responses may indicate an attitude of passivity; they go through the motions that they think will result in correct answers and completion of an assignment, without actively attempting to understand content. Holt's (1964) distinction between students who employ producer (answer-oriented) strategies versus thinker strategies is useful here. He describes ways in which some students avoid active information processing, but develop face-saving gambits to make failure more acceptable.

There has been less research on how teachers can affect student initiative than has been done on attentiveness. Research on differential teacher

treatment of high and low achievers suggests that some teachers may be prey to expectancy effects and actually discourage student-initiated contacts by lower-achieving students, in an effort to gain more control over the timing and nature of their contacts with these students, who may interrupt at inconvenient times (Cooper 1979). Other research suggests that teachers who are more effective overall adjust for students' failure to initiate contacts by systematically monitoring and checking on students while they are working in order to catch problems that the students have not become aware of or have not brought to the teacher's attention (Brophy & Evertson 1976).

Some classroom research suggests hypotheses about kinds of teacher behaviors that are likely to encourage initiative. Research on classroom management has shown that teachers who were very specific about desired student behavior were more successful in attaining their goals (Anderson et al.,1980; Emmer et al.,1980). This suggests that teachers who specify ways in which students can and should demonstrate initiative will encourage this behavior on the part of their students. For example, teachers can clearly indicate and specify points at which students can use certain aids to help them finish a task, such as getting a set of counting beads while doing arithmetic, or checking posted words to help with spelling (e.g., seasonal words, color names). Teachers may develop forms of assignments that encourage and even require student initiative, such as clearly indicating points at which a student should check answers or talk with the teacher or aide about something before proceeding further.

Teachers can communicate to students through their own actions and statements that it is "smart" to seek help when you need it and to recognize what you don't know. As noted earlier, teachers sometimes respond

to contacts initiated by students in ways that discourage further contacts, especially when the timing or content is inappropriate (Cooper, 1979). Teachers' refusal of such contacts is understandable in one sense, because a teacher cannot respond fully to every student initiative, or the momentum and management of the class would be lost. However, frequent rejection of a student's inappropriate initiatives may reinforce the student's attitude that "bothering the teacher" is not worthwhile. Teachers need to clearly communicate to students that seeking help to clarify confusion is acceptable and desirable and they should set up mechanisms whereby students can obtain assistance in appropriate ways. Setting aside regular times for review of work with individual students may help to accomplish this, when combined with clear feedback to the students: "It shows me that you're thinking when you ask questions like that."

Success on Daily Assignments

Not surprisingly, pupils' success on daily classroom tasks has been positively related to their long-term achievement (Anderson, Evertson, & Brophy, 1979; Fisher, et al., Note 3). Learning is enhanced when new information is acquired steadily but gradually, with plenty of practice, until the skills are overlearned and automatic, which requires that most tasks be performed at a fairly high level of success, especially in the basic skills.

Success is influenced, of course, by how well matched the assignment is to the student's abilities. Many persons have addressed this basic question of curriculum design; the teacher must assess both the nature of the knowledge or skills being taught and the prerequisite learning of the student. A thorough discussion of these issues is outside the scope of this paper; however, there are several other instructional strategies that

are independent of the initial task difficulty but that influence level of success by increasing teacher awareness of the student's responses to the instruction. As discussed above, any teacher behavior or instructional characteristic that increases attention to a task and that increases initiative to seek clarification is also likely to contribute to successful performance. A student is more likely to do well on assigned work if (s)he has first attended to the directions and then has sought assistance if confused.

Other ways in which teachers can influence student success on given assignments are monitoring work in progress and providing feedback as soon as possible. If a child makes an error but does not realize it and is not informed about that error, it may affect performance on the remainder of the task, resulting in the practice of errors rather than the practice of desired skills. For example, consider the case of a child who does not understand the basic concept of subtraction, but thinks he knows how to do it and uses an incorrect approach. He works alone for 20 minutes, at which time his paper goes into a basket and is not seen by the teacher until later in the day. While completing his paper, however, he becomes very good at his inappropriate strategy.

If there are frequent interactions with the teacher, aide, or another helper while practicing skills, feedback occurs very soon after performance, so that the practice is more likely to be beneficial. When feedback is delayed, instead, it may be much less salient to the child when it is given and not meaningfully connected to the thinking done earlier. Delayed feedback may be more of a problem for some students than others, especially those who lack the independent work skills necessary to check their own work as they go along(perhaps because they do not understand

the relevant concepts involved). Research on teaching effectiveness (see, for example, Brophy & Evertson, 1976) and on effective classroom management (Anderson et al., 1980; Emmer et al., 1980) suggests that more effective teachers are indeed more likely to provide frequent monitoring and immediate feedback to their students while they are working.

In order to accomplish monitoring and feedback, teachers can incorporate into classroom activities times for checking students' progress, and thus can speak regularly with students who do not initiate contacts when they need help to continue their work (perhaps because they do not realize their errors). This checking may be done by circulating through the room between major teaching activities, such as reading groups, rather than waiting until the end of the morning to examine students' work. Some teachers combine "trouble-shooter" checking with a more formal checking time at the end of each morning or afternoon. More frequent contacts with the teacher can be built into the tasks given to the students (e.g., clear indications to "see me" at the end of one assignment).

A concrete example of this principle of deliberately contacting students to monitor their responses is provided in a model of math teaching developed by Good and Grouws (1979). They suggest a way to organize large-group lessons so that presentation of new content is followed by a brief period of practice during which the teacher deliberately circulates and gets feedback on the students' performance before assigning independent work. This kind of deliberate soliciting of students' responses would be especially important at the beginning of a new skill, when students do not have a firm grasp of the component steps and/or do not have the skills to recognize errors.

Student Understanding of How and Why to Do Classroom Work

The first three categories of student responses are behavioral. This fourth category requires attention to students' thoughts and beliefs, because in many cases what students understand underlies observed student behavior. For example, if a person believes that a task is worthwhile and understands clearly how to complete it, (s)he is more likely to persist at it and to monitor his/her progress. If a person lacks this understanding, (s)he may be more likely to wander off-task.

Research on student understanding of classroom work is sparse, although many people are beginning to recognize this as an important area to study and they are doing initial work (e.g., Doyle, 1979a; Rohrkemper, Note 4; Weinstein & Middlestadt, 1979; Winne & Marx, Note 5). It can be hypothesized that important student behaviors in the areas of attention, initiative, and successful performance may be related to understanding of how and why students work.

There has been little research to date on teacher behaviors or instructional characteristics that are associated with student understanding that support attentiveness, initiative, and successful performance. Other classroom research suggests that teachers' communication of expectations for success and behavior would be an important factor (Brophy & Good, 1974). Similarly, it can be hypothesized that teachers further students' understanding when they are more explicit about how to do the work (emphasizing concepts that are important versus just giving the steps necessary to complete a worksheet) and reasons for work (explaining how a piece of work contributes to important learning versus emphasizing that work must be completed in order to avoid punishment). These are hypotheses that can be tested in future studies in which student understanding is viewed as an important outcome of teaching.

One recent study suggests one way that teachers can help students develop understanding of how to think about instruction. Winne and Marx (Note 5) found that in lessons in which teachers had been more explicit about the necessary cognitive strategies (i.e., useful ways to think through the task), students could more easily describe the strategy (which presumably would help them use the strategy). In other lessons where this information was not given explicitly, students did not know what cognitive strategies were expected by the teacher. This suggests that teachers should not assume automatically that students know, for example, how to study spelling words, how to check for arithmetic errors, or how to read or listen for certain information. If students are expected to carry out such cognitive strategies on their own, teachers should first determine if students know how to approach the task, and, if necessary, teach strategies for accomplishing it.

When monitoring student work and giving feedback on it, teachers can gain valuable information about students' understanding of how and why to do work by questioning them about how an answer was produced (e.g., "show me how you got this answer" asked in a nonthreatening manner). In the case of errors, the student's explanation can provide clues about the cause of the error. In the case of correct answers, students' explanations of their thinking processes may reveal the extent to which they understand relevant concepts versus the extent to which they are applying rules without understanding.

Another revealing question to ask students about their work is, "What are you learning when you do this assignment?" Answers may reveal students' understanding of the purpose of the work, which may influence their attentiveness, involvement, and initiative to clarify confusing points. Elementary children, especially younger ones, have not had

enough experience to relate short-term assignments to long-term goals (e.g., a first grader will not understand how a phonics worksheet will help him/her become a better reader by the end of the year). Thus, their understanding of purposes of work may differ greatly from the teacher's understanding, and that may affect the way the students approach work.

Certainly, time constraints prohibit teachers from questioning students about every assignment, but doing so occasionally can provide rich information for the teacher about hidden student responses. An additional benefit may be that students begin to think about their own thinking processes more, and this may contribute to improvements in their own self-monitoring of school work. This relationship is only hypothesized at present, but current research on student understanding promises to yield insights into the role of students' thoughts about work. This research should provide teachers with productive ways of thinking about students' understanding, and it can suggest strategies for insuring that desired cognitive responses to instruction are occurring.

Conclusion

Research on student responses to instruction has provided teachers with useful concepts for thinking about their instruction and its immediate effects on students. The perspective presented in this article emphasizes that what students do with instruction, how they actively respond to it, will determine what is learned. However, this premise does not imply that teachers have no effect on student responses; on the contrary, it implies that teachers must remain aware of student responses and attempt to influence them by the ways that instruction is organized and conducted.

This stance is not a denial that students should assume some responsibility for their own learning whenever possible. However, it recognizes

that some students (especially lower achievers) will not produce desired responses unless a teacher helps in some of the ways described in this article.

Most of the strategies suggested here for teachers reflect two important principles. First, *teachers must remain aware of student responses* by creating work contacts with all students frequently, on a regular basis, in order to gain information about students' responses through observation and questioning. The second principle reflected in many of the suggestions is that *teachers can help students learn how to respond to instruction* by arranging the classroom environment to make attention and initiative more likely and by specifically teaching students how and when to attend, seek help, and apply certain strategies for understanding instruction and performing work.

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